

⑫

EUROPEAN PATENT SPECIFICATION

④⑤ Date of publication of patent specification: **04.05.88**

⑤① Int. Cl.⁴: **E 02 F 3/00, E 21 C 11/00**

②① Application number: **83903121.8**

②② Date of filing: **30.09.83**

③⑧ International application number:
PCT/SE83/00343

③⑦ International publication number:
WO 85/01536 11.04.85 Gazette 85/09

⑤④ **A DRILLING MACHINE TO BE COUPLED TO AN EXCAVATOR.**

④③ Date of publication of application:
23.07.86 Bulletin 86/30

④⑤ Publication of the grant of the patent:
04.05.88 Bulletin 88/18

③④ Designated Contracting States:
AT BE CH DE FR GB LI LU NL SE

⑤⑥ References cited:
DE-A-1 709 504
FR-A-2 194 849
US-A-2 623 739
US-A-2 969 844
US-A-4 087 010

⑦③ Proprietor: **Sonerud, John Teodor**
Vintervägen 30
S-824 00 Hudiksvall (SE)

⑦② Inventor: **Sonerud, John Teodor**
Vintervägen 30
S-824 00 Hudiksvall (SE)

⑦④ Representative: **Forsheden, Jarl Ragnar et al**
L.A. Groth & Co. AB Västmannagatan 43
S-113 25 Stockholm (SE)

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European patent convention).

Description

Technical Field

The present invention relates to a drilling machine to be detachably coupled to a manoeuvring machine by means of a gripping device on the last-mentioned machine, such as shown in SE—B—411467.

Background Art

In digging and excavating work with excavators, there are often encountered hard earth, stones, rock and frozen ground (in wintertime), which require drilling and blasting to cope with them.

With the exception of large rock excavations where special drilling carriages are used, one is consigned to manual drilling with air or hydraulically driven hand drilling machines for handling minor obstructions. This work is heavy and injurious to health, due to the heavy vibrations propagated to the driller as well as the stone dust liberated during the process and inhaled by the driller during drilling.

US—A—4 087 010 refers to a handheld paving breaker mounted on a carriage slidably arranged on an attachment means hooked on an excavator bucket. The breaker can be mounted to the bucket in one single position only and the mounting must be performed manually. The carriage is arranged at a distance from the attachment means which results in high misalignment stresses. There are no resilient or other means taking up such misalignment stresses.

Disclosure of Invention

It is the prime object of the invention to at least partly set aside the disadvantages of previously known drilling machines. It is also an object of the present invention to provide a drilling machine which does not need to be served by a person especially delegated for the purpose, and which without manual assistance can be coupled to a machine, e.g. a bucket provided with gripping fingers and mounted on an excavator, for carrying out drilling by operating the excavator. The excavator can thus be utilized optionally for excavating or drilling, and when the excavator is utilized during drilling the person normally carrying out drilling and who is idle during excavating work may be appointed to other tasks.

It is also an object of the invention to provide a drilling machine which can be coupled to a machine operating it such that the drilling work can be executed in practically any direction.

It is a further object of the invention to provide a drilling machine which takes up the misalignment forces occurring during drilling as a result of the drilling machine being rigidly coupled to the operating machine, and also to take up the shock stresses occurring when putting down the drill on rock, on a stone or the like and further to even out the compression stresses the drill is subjected to during drilling.

A still further object is to provide a drilling

machine connectable to an operating machine and which comprises a hand drilling machine modified with simple means and in a simple way.

These objects are achieved by the invention having been given the characterizing features disclosed in the claims.

Description of Figures

Figure 1 is a schematic side view of a portion of a drilling machine in accordance with the invention, coupled to gripping means on the bucket of an excavator, and

Figure 2 is a schematic side view of the drilling machine in accordance with Figure 1, coupled to the excavator bucket in a different angular attitude relative thereto.

Preferred Embodiment

The drilling machine in accordance with the invention comprises an ordinary pneumatic or hydraulic drilling machine 1, of which an upper portion is illustrated in Figures 1 and 2, and which is provided with two handles 2 and 3, with the aid of which the user operates the drilling machine during manual drilling, the inventive drilling machine also including a means 4 attached to the machine 1.

The means 4 includes a holder 5 partially surrounding a head 6 on the upper portion of the machine 1, and with the aid of which a bolt 7 and handles 2 and 3, which are threaded on a shaft 8 taken through the head 6 and removable therefrom, are removably attached to the head 6. A rubber block 9 is attached to the upper side of the holder 5. The upper portion of the rubber block 9 is attached to the lower portion of a tube 10, and to the lower portion of a piston rod 11 incorporated in a gas spring which also includes a cylinder 12. A tube 13, the interior cross section of which somewhat exceeds the exterior cross section of the tube 10 is telescopically displaceable on the tube 10 and is provided with a slot 14, in which thrusts a pin 15 attached to the tube 10. Withdrawal of the tube 10 from the tube 13 is restricted by the pin 15 when it contacts a locking plate 16, attached to the lower portion of the tube 13, and covering the open, lower portion of the slot 14. The pin 15 and slot 14 serve as guide means for preventing rotary movement between the tubes 10 and 13. Such movement is also inhibited by the tubes themselves, if they are made with a quadratic cross-section.

The upper portions of the cylinder 12 and tube 13 are attached to two members 17 and 18, the upper ends of which are attached to the ends of a circular tube 19.

When the drilling machine 1 and means 4 are to be used for vertical drilling, the gripping arms 20 and 21 are inserted in both ends of the tube 19 in the manner illustrated in Figure 1, said gripping arms 20 and 21 being pivotally mounted on an excavator bucket 22 provided with a recess 23, e.g. of the kind described in SE—A—411467 and marketed under the registered trade name of CRAB JOHN. The drilling machine 1, 4 can lie on

the ground during this procedure. The bucket is then lifted to a suitable height, during which the machine 1, 4 assumes a substantially vertical position, since the gripping arms are not clamped in the tube but only loosely inserted therein. The bucket is then lowered vertically until the drill touches the ground. The shock occurring thereby is taken up by the gas spring 11, 12, thus preventing the drill and the rest of the drilling machine from being subjected to damage. During drilling, the gas spring is compressed a predetermined distance and the drill will therefore be pressed into the drill hole with a predetermined force adjusted to the purpose, and substantially constant, this force being 588N (60 kp) for certain applications, even if the distance between the gripping arms 20, 21 and drilling machine 1 is not constant. This distance is however limited by the lengths of the gas spring 11, 12 and tubes 10, 13.

The lateral misalignment forces to which the drilling machine 1, 4 is subjected during drilling are taken up by the rubber block 9 which thus functions as a yielding joint.

When the drilling machine 1, 4 is to be used for horizontal drilling, the gripping arms 20, 21 grip round the tube 19 in the manner illustrated in Figure 2, the bucket 22 then being lifted and taken toward the material to be drilled. The gas spring 11, 12 and block 9 take up the forces acting on the drilling machine 1, 4 in horizontal drilling as well, so that effective drilling without damage to the machine 1, 4 is achieved.

It should be understood that drilling can also be executed in directions other than those illustrated on the drawings, and the directions corrected during work by manoeuvring the bucket 22 and machine 1, 4 so as to alter the angle between the gripping arms 20, 21 and the tube 19 when the arms grip the tube as in Figure 1, or as in Figure 2.

It should also be understood that the invention is not limited to the illustrated and described embodiment, but can be modified within the scope of the invention as claimed. For example, the rubber block and/or the gas spring 11, 12 can comprise any kind of elastic elements at all, such as one or more springs. The invention is thus only restricted by what it disclosed in the claims.

Claims

1. A drilling machine to be detachably coupled to a manoeuvring machine e.g. an excavator by means of a gripping device (20, 21) on the last-mentioned machine, characterized in that the drilling machine comprises a hand-held drilling machine (1), removably attached to a holder (5), coupling means (19), to be detachably gripped by said gripping device in anyone of at least two possible positions relatively thereto, and resilient means (11, 12; 9), to take up lateral misalignment

forces and shock and/or compression forces between the machines occurring in conjunction with drilling, the resilient means being connected between the holder (5) and the coupling means (19) and in line with the drilling direction of the hand drilling machine.

2. A drilling machine as claimed in claim 1, characterized in that the resilient means comprises a rubber block (9) and a gas spring (11, 12) connected to each other.

Patentansprüche

1. Bohrgerät, das mittels einer Greifvorrichtung (20, 21) an eine Arbeitsmaschine, z.B. einen Bagger, lösbar angeschlossen ist, dadurch gekennzeichnet, daß das Bohrgerät eine an einem Halter (5) abnehmbar befestigte handbetätigte Bohrmaschine (1), ein durch die Greifvorrichtung in einer von wenigstens zwei, relativ dazu möglichen Positionen lösbar festgehaltenes Kupplungsorgan (19), sowie ein Dämpfungsorgan (11, 12; 19) zur Aufnahme von seitlichen Verschiebekräften, Stößen und/oder Druckkräften umfaßt, die beim Bohren zwischen der Maschinen auftreten, wobei das Dämpfungsorgan zwischen dem Halter (5) und dem Kupplungsorgan (19) angeordnet ist und in Linie mit der Bohrrichtung der handbetätigten Bohrmaschine verläuft.

2. Bohrmaschine nach Patentanspruch 1, dadurch gekennzeichnet, daß das Dämpfungsorgan einen Gummiblock (9) und eine Gasfeder (11, 12) umfaßt, die miteinander verbunden sind.

Revendications

1. Perforatrice destinée à être accouplée de manière détachable à une machine de manoeuvre, excavatrice par exemple, au moyen d'un dispositif de préhension (20, 21) prévu sur cette dernière machine, caractérisée en ce que la perforatrice comprend une perforatrice (1) tenue à la main et fixée de manière amovible à un support (5), un moyen d'accouplement (19) destiné à être saisi de manière détachable par ledit dispositif de préhension à une quelconque d'au moins deux positions possibles par rapport à ce dernier, et un moyen élastique (11, 12; 9) destiné à absorber toutes forces de non alignement latéral et forces d'impact et/ou de compression qui apparaissent entre les machines lors du perçage, le moyen élastique étant monté entre le support (5) et le moyen d'accouplement (19), et étant en alignement avec la direction de perçage de la perforatrice manuelle.

2. Perforatrice selon la revendication 1, caractérisée en ce que le moyen élastique comprend un bloc en caoutchouc (9) et un ressort à gaz (11, 12) reliés l'un à l'autre.

Fig. 1

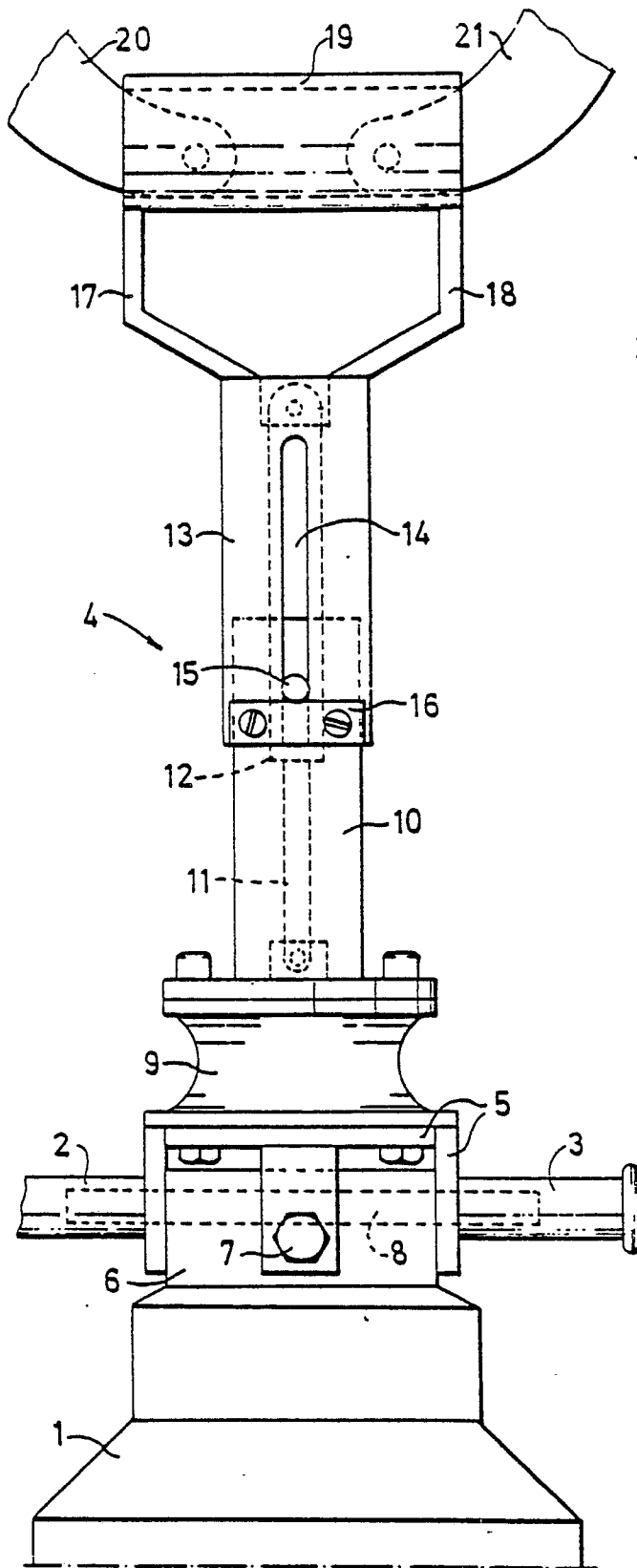


Fig. 2

